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ANIMAL LIFE IN THE NETHERLANDS ANTILLES

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Cover picture:

*Bonaire, breeding colony of the rare flamingoes,
which need the greatest protection. (Courtesy of K. Mayer).*

Introduction



In the Netherlands Antilles we do not find the romantic animal species that appeal so much to our imagination in Surinam and elsewhere in the tropics. The naturalist will look in vain in the Netherlands Antilles for jaguars, cougars, kangaroos and giant snakes. Yet the animals of the Antilles, particularly those in the colourful coastal seas, are most fascinating and varied and, from the point of view of science and conservation, they are extremely important. On land, it is the numerous and multi-coloured birds, and in the seas the riot of colours of the corals and the fish that fascinate us. Moreover, species that occur exclusively, or almost exclusively, in the Netherlands Antilles deserve our special attention and constant vigilance for their preservation.

The growth of large industries, bringing unheard-of prosperity, especially in Curaçao and Aruba, has had serious consequences for the work of conservation. For this reason all those who have the natural beauty of the Antilles at heart are convinced that measures should be taken to ensure the preservation of wild life, as yet not threatened on the Island of Bonaire, by setting aside large sections of this characteristic part of the Netherlands Antilles as natural preserves and, both inside and outside the Netherlands Antilles, encouraging interest in the beauty of the islands by means of conducted tours, etc.

The broadcast talks printed here were given in the hope that, by spreading knowledge of the scenery and wild life of the Netherlands Antilles, a love of this fascinating world might be aroused.

A handwritten signature in black ink, appearing to read "K. H. Vooous". The signature is written in a cursive style with a long horizontal line extending to the right.

PROFESSOR K. H. VOOUS,
of the Protestant University of Amsterdam, Curator
and Deputy Director of the Zoological Museum of the
Municipal University of Amsterdam.

The various species

I

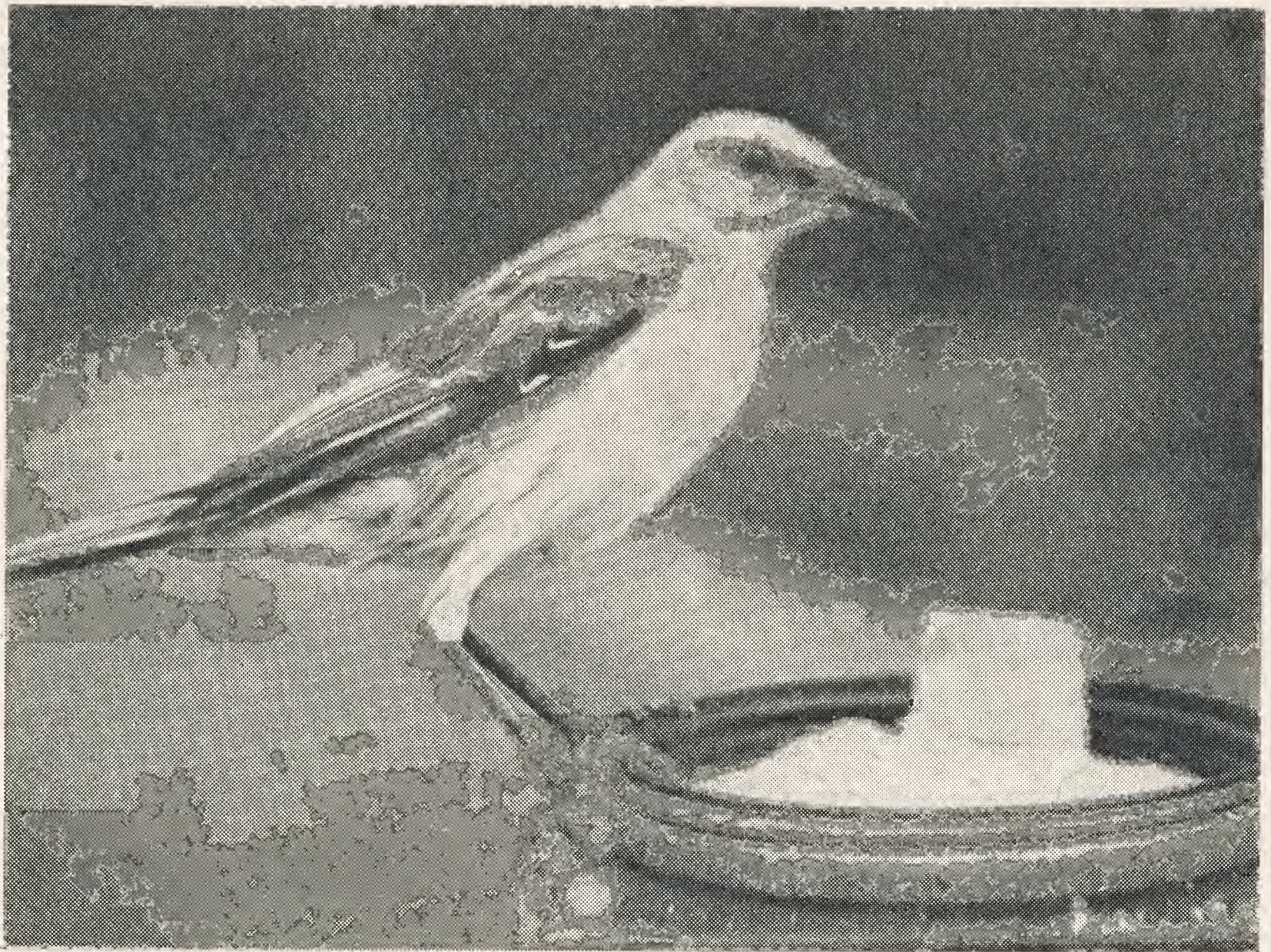
The animals of the Netherlands Antilles are very different from those of Europe. It is hard even to find points of resemblance. Hence it is quite natural that the small South American desert hare from Aruba should have come to be called "little rabbit" and that the South American crested quail should now be referred to in Papiamento, the dialect of Curaçao, as "patrushi" or "partridge". Neither rabbits nor partridges are, however, to be found in this part of the world. By using the familiar European names people have, perhaps unconsciously, tried to remove something of the weird and unknown attaching to the animal kingdom of the Antilles.

Wild life on Aruba, Curaçao and Bonaire is rich mainly in the South American species foreign to Europe. Genuinely West Indian or Caribbean species also occur, however, especially of course on the Leeward Islands, St. Martin, Saba and St. Eustatius, but also on Aruba, Curaçao and Bonaire.

Wild life in the Netherlands Antilles, especially as regards land animals, is not notable for its variety. This must certainly be attributed to a large extent to the smallness of the islands, very small indeed, however important Curaçao and Aruba may have become for the world economy. Nor is the difference in scenery on the islands to be compared with the very varied scenery we find on the South American continent. Aruba, Curaçao and Bonaire have no luxurious tropical jungles, nor fertile savannahs, so that the animals requiring this kind of environment are not to be found on the islands.

Characteristic of the wild life of the islands, however, is the large number of examples of certain species, in particular birds and lizards. They enliven and add to the picturesqueness of the scenery and in the birds especially great interest is nowadays shown on the islands.

One of the most popular and most common birds on Aruba, Curaçao and Bonaire is certainly the Caribbean or West Indian mocking thrush, better known under the onomatopoeic Papiamento name of "chuchubi". The build, behaviour and, in particular, the song of this mainly light-grey bird remind us immediately of the thrush. As it hops about in the gardens with cocked tail, eats of all sorts of fruits in the trees and shrubs and sings its sweet, thrush-



Curaçao: Chuchubi or southern mockingbird feeding.

Courtesy of Dr. Ir. R. Flachs

like song from the roof of a house, or the top of a tall cactus, it evokes the familiar picture of a blackbird or a thrush in these "alien" parts, peopled mainly by South American species.

The chuchubi is a representative of the family of the mocking-birds and thrashers confined to America, of which the well-known North American mockingbird is also a member. The chuchubi's song is, however, certainly less varied than that of his famous North American cousin, but for a tropical bird his song is remarkably fine and loud. He is the undisputed songster of the Antilles and, if inclined, he may also do some "mocking", i.e. imitate other sounds.

The chuchubi is found everywhere on the islands, in wooded as well as in barren spots, in the beautiful gardens of Juliana Village, in the extensive grounds round the country houses and round the small cunucu cottages, in fruit orchards, but also in cactus wastes, in thorny brushwood and on sparsely grown limestone plateaux. He is ubiquitous in the best sense of the word and, as such, typical of the behaviour of most insular species.

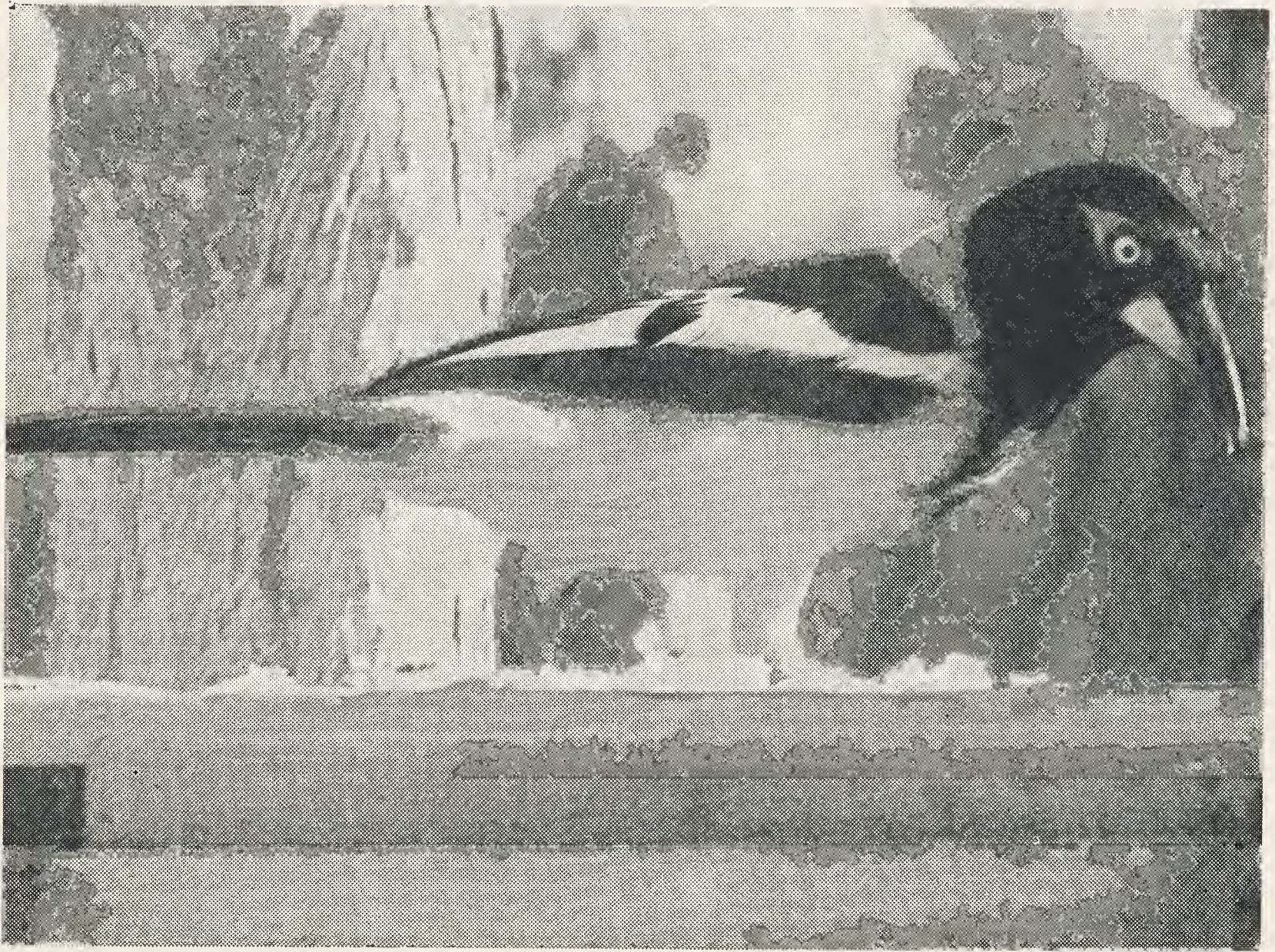


Curaçao: Cicada, an insect noted for its prolonged shrill notes.

Courtesy of Dr. Ir. R. Flachs

His diet is as varied as his habitat: it is animal as well as vegetable with a preference for juicy fruits. That is why these birds are often seen eating opuntias, dates, mangoes, papayas and other juicy tropical fruits. They also eat the pods of the divi-divi, the wabi and other leguminous trees and shrubs. On their forays through the brushwood and in the tree-tops and on rocky soil they catch, in addition, lots of smaller and larger insects such as beetles and cockroaches, caterpillars, ants, wasps, flies and cicadas, also spiders, snails and even small lizards. The omnivorous nature of the West Indian mocking thrush is also shown by the fact that he is notoriously predatory, eating the eggs and young of all sorts of small birds. Curaçao ornithologists have even caught him in stealing practically all the eggs of a small colony of terns.

Being a regular tropical songster the chuchubi is a bird whose activity shows hardly any signs of diminishing in the hottest hours of the day. His song is heard all day long and his cheerful call sounds even during the very hottest hours of the day in the dry prickly cunucu. He is silent during the night and even during the short periods of morning and evening twilight. Tropical night songsters are scarce everywhere in the world. One such species is found



Curaçao: Orange troupial feeding.

Courtesy of Dr. Ir. R. Flachs

on Aruba and Curaçao, which is quite a rarity. It is the so-called chonchorogai, a small bird, related to our buntings. He is found even right in the centre of Willemstad, the capital of the Netherlands Antilles and, if sufficient food were to be found in the streets, he would be the right species to develop into "house sparrow" in the larger towns of Curaçao and Aruba. A modest bird with the colour of a sparrow, he can nevertheless sing an attractive song. He sings like the buntings, with complete abandon, his head lifted and with wide-open bill. In the daytime, but especially at night, we are moved by the chonchorogai's song, which sounds through the strident chirping of the numerous grasshoppers and cicadas.

In addition to these excellent songsters we also find veritable gems among the birds of the Netherlands Antilles, for instance the troupials and humming-birds.

Troupials are beautiful yellow and black or orange and black birds with the characteristics of the orioles and starlings of the Old World in appearance, behaviour and song. They are, however, members of quite a different family,



*Emerald hummingbird
(female) on her nest
with young.*

Courtesy of
Mrs. M. Diemont-Koiter

which is characteristic of the New World and which has its greatest variety of forms in South and Central America.

The melodious loud fluty song of the orange troupial of Aruba and Curaçao resembles the oriole's call. Also the pouch-shaped nest usually hanging in the bifurcation of a tree resembles the oriole's nest.

The yellow troupial's call is in contrast decidedly unmelodious and may best be described as an unpleasant kind of miaowing or screeching. That is why the bird is called trupial cachó in Papiamento, which means dog troupial. The nest of the trupial cachó is long and bottle-shaped and resembles the nests of the African and Indian weaver birds. Weaver birds are not found in the New World, however, and all the ingeniously woven big hanging nests which one can see in conspicuous places on the trees in particular in Central and South America have been made by members of the troupial family. The slender nests sometimes nearly two feet

long which one may see here and there on Aruba, Curaçao and Bonaire at the far ends of the thinnest branches of tall tamarind and mangrove trees are the work of the yellow troupial. In these long pendent nests the eggs and the young are well protected against birds of prey and tree-climbing marauders. Moreover, one couple builds more than one nest in one tree, of which only one is used for breeding purposes. In the other nests the male may roost and also the greater part of the courtship takes place in the additional nests. When a marauder, for instance a marten, cat, squirrel, rat or monkey has at last with much difficulty managed to reach the nest dangling at the end of a thin branch he even runs a great risk of finding it empty, while the nest containing the brood hangs a few branches further away. The yellow troupial of the Antilles is of South American origin; in South America effective protection for the nests of gaudily coloured birds is imperative. On the Antilles we do not find any tree-climbing animals of prey, however, and protecting the brood in pendent nests is therefore less imperative. However, the yellow troupial continues to build his nests in his own particular fashion.

Veritable gems, sparkling like precious stones, are the hummingbirds, two species of which breed in Aruba, Curaçao and Bonaire. On St. Martin, Saba and St. Eustatius three species are found. Like the mockingbirds and the troupials the hummingbirds are members of a family only found in America. The small sparkling and gaudy flower-visiting birds from Africa and Indonesia belong to quite different families, namely to the sunbirds and honey-eaters.

The hummingbirds are among the smallest and most colourful of birds. Most species live in the South American states of Colombia and Ecuador. The smallest species is hardly bigger than a bumble-bee. The smallest Antillean species is the emerald hummingbird or the "blenchi" of Aruba, Curaçao and Bonaire. Including its bill – nearly an inch long – this bird measures 3.2 inches. It is a delightful sight to see these small swift birds flitting from flower to flower with buzzing wings, hovering in the air. The number of wing-beats per second has been established photographically: 50–80 per second, which feat is all the more remarkable if it is borne in mind that the birds weigh hardly more than .07 oz.

Hummingbirds feed practically only on nectar. With their long tube-like coiled tongues, which may be protruded far beyond the bill, they manage to reach deep into the flowers and to feed on even the best concealed nectar stores. At first it was thought that hummingbirds fed only on nectar. It has also been contended that they feed only on flower-visiting insects and spiders. It has now been established, however, that hummingbirds feed on nectar as well as on minute insects and spiders and that, when visiting the flowers, they transfer pollen from flower to flower and in this way play the same indis-

pensable role in cross-pollination that is played in this country by bees and bumble-bees. In contrast to the insects, hummingbirds are not guided by smell but by sight to the flowers whose nectar they feed on. For that reason hummingbird flowers, like all other so-called bird flowers, have not a particularly strong smell but usually have conspicuous colours, frequently violently red hues.

In contrast to the African and Asian sunbirds and other flower-visiting birds of the Old World the West Indian hummingbirds never perch on flowers or flowers stalks, but hover in the air in front of the flowers. Even when the nectar is hidden too deep in the calyx for their long tongues to get at, with their needle-like bills they peck a small hole in the calyx while hovering, insert their bills, and in this way manage to suck up the nectar which would otherwise be inaccessible to them. This sort of visit naturally does not result in cross-pollination, for which reason such a visit is sometimes called "illegitimate".

Flowering cacti, flamboyants and bougainvilleas visited by hummingbirds belong in the landscape of the Netherlands Antilles; they bestow upon the scenery a decidedly cheerful South American touch.

The various species

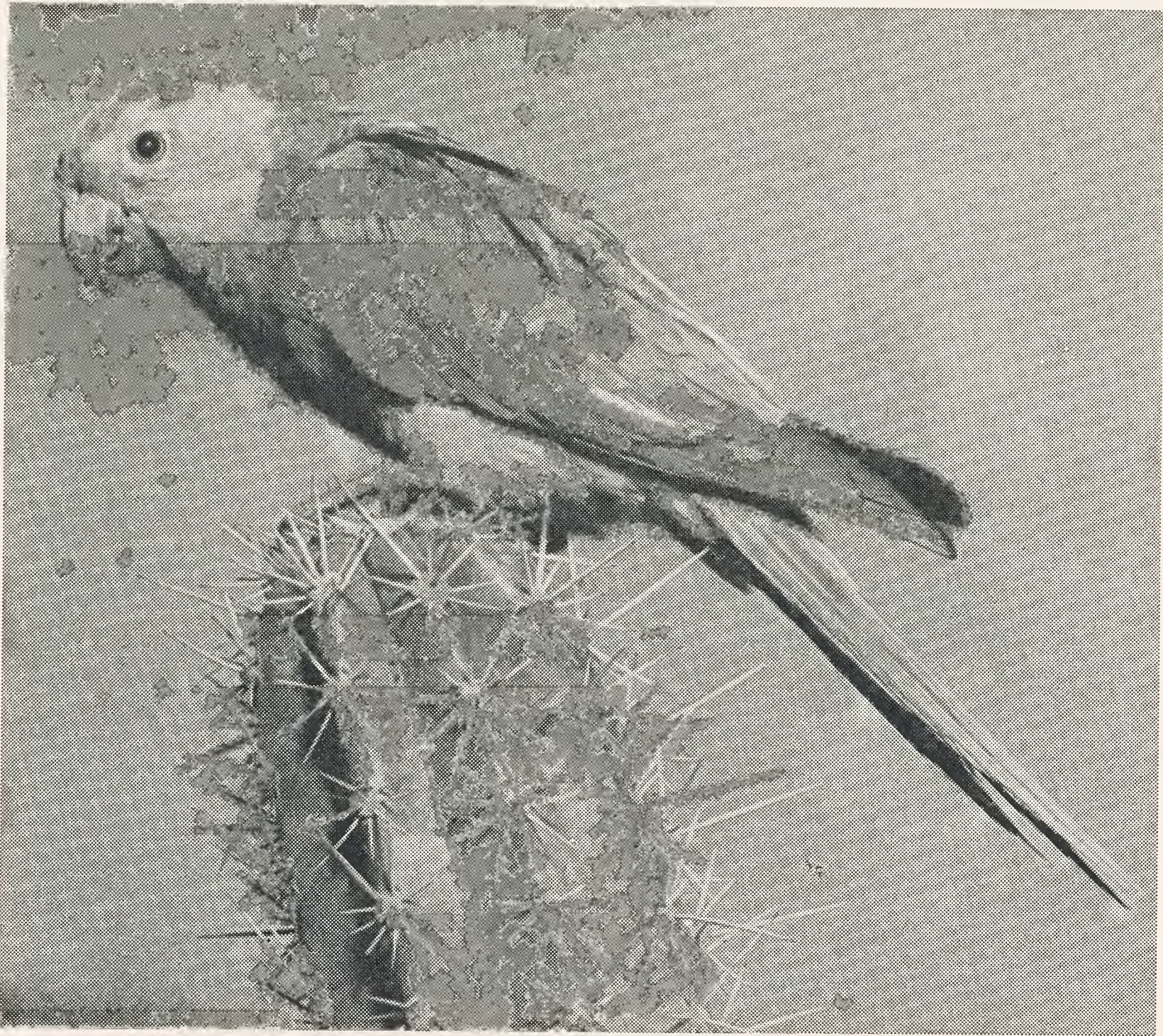
II

The animal kingdom of the Netherlands Antilles does not constitute a well-defined whole, since the fauna of each of the islands of Aruba, Curaçao and Bonaire is not absolutely identical. For example, only on Aruba do we find burrowing-owls and rattlesnakes in the stony deserts and in the erosion gullies strewn with boulders and stones. Only on Curaçao can we find a small South American species of deer, which may, however, have been imported hundreds of years ago from the neighbouring mainland of Venezuela by the original Indian island population. The pearly-eyed thrasher, a remarkable bird, is restricted to Bonaire and is not found on Curaçao or Aruba. Further, troupials are only found on Aruba and Curaçao and the same applies to the "kinikini" or American kestrel. The big whitetailed buzzard and the other big Antillean bird of prey, the caracara or "warawara", are however found on all three islands. Several other species of birds have a similar general distribution on Aruba, Curaçao and Bonaire. Equally among the few fresh water fish and scorpions and among the land and fresh water snails, we come across species having this general pattern of distribution.

It is hoped that the foregoing remarks have served to give the reader an impression of the more or less independent character of the animal kingdom on each of the islands.

In this connection we must also draw attention to what is called geographical variation. The fact that a certain species may be slightly different in appearance to those on any of the other islands is proof of the existence of geographical variation on the Netherlands Antilles.

This is particularly true of the West Indian parakeet or "prikichi", which is a well-known bird on Aruba, Curaçao and Bonaire. On Aruba this species has a mainly olive-green head, whereas the head of the species found on Curaçao is yellow; the yellow of the species living on Bonaire has generally spread much further along the sides of the head and across the forehead, the colour being also more deeply orange than on Curaçao. Each of the islands also has its own characteristically coloured and proportioned whip-tailed lizard or "blausana"; geographical variation may also be observed among the "cocolishi di calucuna" and other land snails.



Curaçao: Prikichi or Caribbean parakeet.

Courtesy of Friar M. Arnoldo

I want to discuss in more detail now the distribution and habits of the West Indian parakeet, because in this way we shall meet with certain general problems.

The West Indian parakeet is not confined to Aruba, Curaçao and Bonaire but is also widely distributed throughout the northern part of the South American continent, from Surinam to Colombia. Here the bird lives in cactus deserts and other arid regions and in the savannahs and shows a certain, generally slight, measure of geographical variation. The mainland parakeet on the whole greatly resembles the parakeet found on Aruba, but differs greatly from the parakeet found on Bonaire and Curaçao. We shall try to account for this fact.

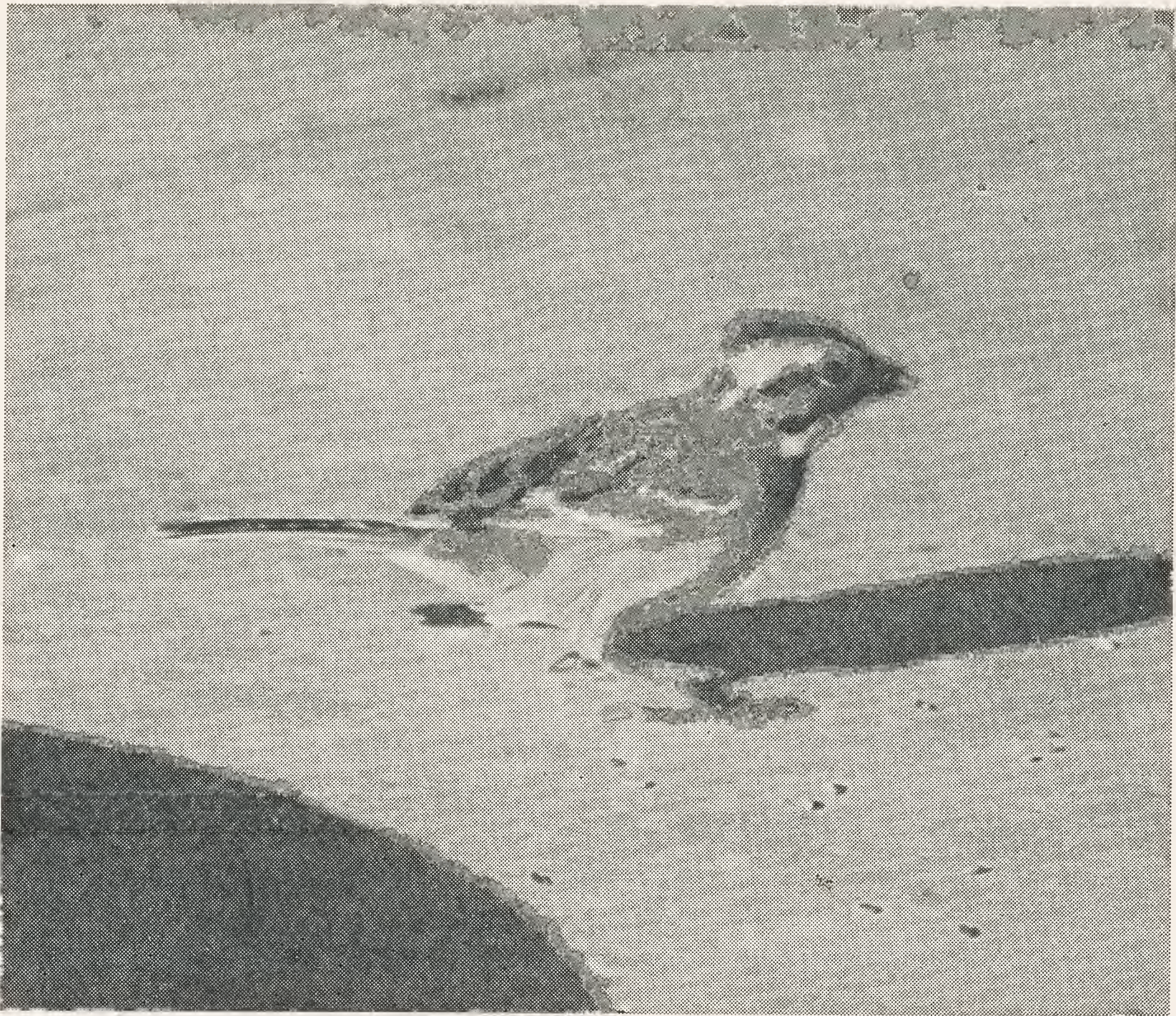
Aruba lies only 17 miles from the Paraguaná Peninsula, the mainland of Venezuela. The sea separating Aruba from Venezuela nowhere has a depth

exceeding 650 feet. The level of the Caribbean Sea has, however, not been constant in the course of the earth's history. During the glacial epochs of the Pleistocene in particular, the level of the sea everywhere in the tropics must have been between 325 and 650 feet lower than at present. It is therefore not impossible that, during that period, the island of Aruba was situated more closely to the South American mainland, or may even for a time have formed part of the enlarged Paraguaná Peninsula. This must have resulted in close contact and interchange between the animals of Venezuela and Aruba. The great resemblance of the Aruban parakeets to those on the mainland and the fact that, as we have already seen, the rattlesnakes and burrowing-owls are found on Aruba and *not* on any of the other islands, may well be the result of this contact.

The distance separating Curaçao from Aruba is greater than the strait between Aruba and the mainland: 47 miles. Furthermore, the sea is very deep here; between Curaçao and the mainland depths of 4,600 feet have been measured. Curaçao has – in contrast probably to Aruba – never been connected with the mainland of South America; it is a genuinely “oceanic” island, like Bonaire.

It is not only strange that the Curaçao parakeets are quite different from the Aruban and mainland parakeets as regards the colour pattern of their heads. Stranger still is that the unvarying character of this colour pattern seems to indicate that these birds never fly from one island to another or to or from the mainland, though the distances involved are considerably less than 60 miles.

And here we meet with two general phenomena, representing two separate problems: firstly, the fact that many species of birds living on islands in the tropics – not only in the Caribbean area but also in Indonesia and in the Pacific – are genuine residents, incapable even of crossing narrow straits. Contrast with this the fact that other species not only cover enormous distances on their annual migrations, but regularly cross, twice a year, seas a few hundred miles wide. The parakeet is one of those genuine residents. The red hummingbird or the “blenchi tornasol” on the other hand, which also breeds on Aruba, Curaçao and Bonaire, seems to leave the islands at irregular intervals and also shows migratory tendencies on the nearby South American continent. Despite its small weight (approx. .09 oz.), this little bird manages to cross 20 to 60 miles of the Caribbean Sea, defying the strong northeasterly trade wind. I myself have seen such a small bird fly out to sea with buzzing wings on the southeast coast of Bonaire, hardly more than 15 feet above the waves, and disappear quickly in the direction of the coast of Venezuela, about 60 miles away.



Curaçao: Chonchorogai, a South American bunting or sparrow of wide distribution.

Courtesy of Friar M. Arnoldo

The second phenomenon I alluded to was that of island variation: that form of geographical variation that is apparently without purpose, since we do not know for what reason, or for what precise purpose, the small parakeet populations of Curaçao and Bonaire possess such striking head colours.

Similar geographic variants, for which the life of the bird offers no explanation, are found on many other small islands. They are quite different from, and should not be confused with, a totally different form of geographical variation which we also meet with on the islands: the geographical variation that is determined by climatic conditions. The fact that various species of birds breeding on Curaçao, Aruba and Bonaire have pale colours in comparison with their nearest relatives, is one of them. For example, the small finch-like bird called "moffi" in Papiamentu, the small ground dove or the "totolica", and the rufous-collared sparrow or "chonchorogai", are among the palest represent-

atives of the South Caribbean geographical variants of these species. It is supposed that this is due to the very dry and sunny, "bleaching" climate of those regions.

The "chonchorogai", which I described as a tropical nocturnal songster in the foregoing chapter, occupies an important place among this group. This small bird, which the North Americans call the Andean sparrow, is widely distributed in Central and South America, as far south as Chile. In all these regions, however, it is only found in subtropical or temperate zones or in mountainous regions. It follows that this bird is a mountain species in tropical Central and South America. Only on Curaçao, and probably also somewhere in an isolated valley in Venezuela does it descend to sea level, i.e. into the tropical zone. That is why, as a result of the desiccating and bleaching action of the desert climate of Curaçao, the feathers of the Curaçao "chonchorogai" are by far the palest of what we can observe of this species elsewhere in Central and South America.

I would now like to tell you more about the life of the Caribbean parakeet. It is one of the noisiest, commonest and most conspicuous birds of Aruba, Curaçao and Bonaire. In the middle of the 18th century it was already known to Linnaeus, the great biologist who devised a system of classification for plants and animals, so that it seems always to have been very numerous. This bird is now found on the islands in every kind of scenery, including the mangroves. Its staple diet consists of all sorts of tree fruits such as mangoes, sour-sops, etc. but also cactus fruits and dividivi pods. The birds also eat the ripe grains of the "maishi chiquitu", a kind of maize from which the native food "funchi" is prepared. When the parakeets visit the fruit orchards in large, deafeningly screeching swarms, or feast on the unripe green ears of maize, they may do damage locally. These birds, which so easily adapt themselves to varying conditions, build their nests in all sorts of holes and burrows: usually the holes have been cut out by the birds themselves in the large tree-nests of the termites which are still inhabited by the insects, but I have also found their nests in the mouldering stem of a thick date palm, in natural holes in steep limestone walls and in holes dug by the birds themselves in loam walls, as is done by the sand martins, kingfishers and bee-eaters of the Old World. These birds undoubtedly prefer termite nests. With their stout bills they cut into the hard ligneous structure a curving passage about two feet long leading into a dome-shaped nest approximately one foot in diameter and 6 inches high. In this dark hole the female parakeet lays her clutch of 5 to 6 roundish, white eggs. She lays them on the bottom of the nest without any protective layer. And all the time the thousands of white ants or termites continue to live their own lives in the space left to them in this porous mass

after they have smoothed or closed down the damage done by the parakeets. We find this kind of living together everywhere in the world where termites build their large nests on the ground and in the trees. Sometimes we see kingfishers, sometimes parrots and parakeets (as on Aruba, Bonaire and Curaçao) making their nests in the termite structures. After the breeding season, when the nests have been deserted, other animals may seek refuge in them; on Curaçao, for instance, we may find rats and snakes in these nests.

Yet the information available on the West Indian parakeet is still very incomplete. We know hardly anything about such things as how the couples are formed, how the male and female recognize each other, how long the "parakeet marriage" lasts, how the male and female bird share the nest-building activities, the diet of the young, etc. Here lies a large and interesting field of investigation for Antillean ornithologists. If at the same time the parakeets from the various islands could be crossed locally we would learn more about the hereditary qualities of geographical variation.

Bird life on Curaçao

Visitors to Curaçao are immediately struck by the fact that the island is rich in birds, although not so much in species as in numbers. So far, over 130 different species have been definitely established. Of these 40 are native breeders; more than 50 migrants and the remainder summer or winter visitors.

The land-bird fauna bears an impoverished Venezuelan character, but the typically West Indian birds like the moffi or black faced-grassquit and the grasshopper sparrow are of fairly frequent occurrence.

On comparing the avifauna of Aruba, Curaçao and Bonaire with that of the Venezuelan Paraguaná Peninsula we find that various species of residents are represented by the same subspecies in these two regions; e.g. the sloké or crested quail, the green parrot or Lora of Aruba and the orange troupial; furthermore, there are species that have their own subspecies on the islands like the kinikini, the parakeet (three subspecies), para di misa and moffi.

There are also forms that are native to the islands but are absent on the Peninsula, for instance the barn-owl, the pearly-eyed thrasher of Bonaire and the chonchorogai.

It is peculiar that the parakeet, which is found on all three islands, has a different colour pattern on each island. The Aruban parakeet's head has little yellow, the Curaçao parakeet's head has a fair amount and the Bonaire parakeet has most.

The distances between the islands are not very great. When the weather is favourable one can even see Bonaire from Curaçao with the naked eye. The existence of a subspecies characteristic of each island would seem to indicate that the parakeets do not fly from island to island.

On Curaçao there are only a few species that are confined to one specific habitat. One of them is the grasshopper sparrow, which is scattered over the island on arid grassy plains only. Practically all other species can be found in the towns as well as along the roads, in the manzanilla brushwood, on the bays, even on the summit of Sint Christoffel Hill.

To give you as complete a picture as possible of bird life on Curaçao in the space available, I shall make a tour of the island with you.

If we start with the houses the chuchubi or mockingbird will immediately attract our attention. He is a genuine lover of man, found near practically every house. You will also find him regularly in the country in the cunucu. Further, we commonly see the baricageel in our gardens. This bird owes its Dutch name of "suikerdiefje" ("sugar thief") to his love of the sugar-basin, which he also manages to find inside the house and then eats of it to his heart's content. Also the moffi and the chonchorogai, though essentially their habitat is the cunucu, like the presence of man, while the hummingbirds sometimes nest on the verandah.

I am always especially interested in the fresh-water ponds, here called "tankies". Here one finds an abundant bird life amidst the most beautiful water lilies and the rushes. Little grebes, rails and coots at once draw our attention. We would not expect these genuine marsh birds on such a predominantly arid island as Curaçao.

When the spring migrations begin the blue-winged teal congregate in large numbers. In 1956 we even observed a flock of over 140 of these birds.

In the wabi brushwood surrounding the ponds we find the tropical and grey kingbirds, which take their toll of the many red and green coloured dragonflies continually hovering and flying over the water.

The salinjas or salt-pans are places where scores of birds congregate, especially during the migratory season. Each species has its own special haunt where it looks for food according to its nature and the shape of its bill.

The plovers, sandpipers and other waders, called "snepi" and "lopi" in the vernacular, are to be found here. The least sandpipers and the semipalmated sandpipers are especially conspicuous on account of numbers and behaviour.

Willetts and dowitchers are rare migrants. Many of these waders are to be found on salt as well as on fresh water. The American or Wilson's snipe, the pectoral sandpiper and the solitary sandpiper, on the other hand, prefer fresh water, the common snipe requiring in addition a protective cover of leaves.

Conspicuous are the golden plover and the grey plover. The former is a rare migrant but the latter has been observed on Curaçao all the year round. The semipalmated plover is also frequently seen. The snowy plover and Wilson's plover are the only species of plover that have so far been found breeding on the island.

It is always a strange sight for me to see birds like the grey plover, the semipalmated or ringed plover and the turnstone, which are so familiar to us on Dutch shores, running about here under the hot tropical sun. They do not mind the heat at all and behave in exactly the same as they would in colder climes.

On the south coast we can occasionally see the brown pelicans hunting for

*Kinikini or
South American kestrel.*

Courtesy of
Friar M. Arnoldo



fish. The frigate bird or macuacu is practically always there, especially near the entrance to St. Anna Bay and in the fishing-villages of Boca San Michiel and Westpunt. A well-known roosting-place of these birds is Isla Macuacu, but so far the birds have not been found breeding on Curaçao.

The belted kingfisher, a migrant from North America which on rare occasions may stray to Europe, is a bird that can also regularly be seen during the six months of "winter" on the bays and inlets.

The Louisiana or tricolored heron, the green heron and the night heron breed in the mangroves. In addition to these three breeders there are five other species of herons, of which the great blue heron is the biggest and the little egret the smallest. The ala blancas preferably roost in the mangroves. In the evenings we may see many of these birds on their way to their roosts in these shrubs. The para di misa or yellow warbler is the commonest bird of this region.

Where the soil is fertile on Curaçao many parakeets, orange and yellow troupials may be seen competing with the plantation owners for the yield of the fruit-trees. The ala duru is a species of turtle dove that we should mainly

look for in these parts. Another pigeon, the buladijfi, prefers, acacia wastes and likes to feed on the seeds of the chimichimi, a kind of thistle.

In the southern part of Curaçao we find the large inner bays where every year various species of terns and gulls build their nests on the small islands in these bays. The common tern, the little tern and the roseate tern are among the regular breeders. Two years ago the first breeding colony of the Cayenne tern ever discovered was found in the saltpans belonging to Mr. Jan Thiel. The laughing gull, which is of frequent occurrence and which regularly plunders terns' nests, has not yet been found breeding.

The Bahama pintail and the black-necked stilt were reported to be breeding on the island for the first time a number of years ago. It is a remarkable fact that they had selected the salt-pans as a biotope.

On Curaçao a black bird is always to be seen near grazing cows. It is the chuchubi pretu, a species of cuckoo which shows some resemblance to the magpie in its behaviour. This bird settled on Curaçao not so very long ago. It is said to have come to the island on a vessel together with a shipment of cows. From Curaçao it first settled on Bonaire and afterwards also on Aruba.

The stalactite caves found everywhere on the island are the haunt of the palabrua or barn-owl, one of the smallest subspecies of a species distributed throughout the world.

The northwestern part of Curaçao is intersected by many hills. Here the scaly-naped pigeon has been able to maintain a foothold. The valki or white-tailed buzzard can also be seen soaring over the summit of Sint Christoffel Hill, the highest eminence on the island. Both species are nearing extinction as a result of injudicious and excessive shooting.

The terns are the only species that have a periodic breeding season. These birds return to the island each year in March and April and breed there and rear their young during the months of May – August. Perhaps the ducks and black-necked stilts may also be said to have a fixed breeding season. At the moment too little is known about the habits of the Curaçao birds to enable us to say anything definite on this head.

The other species have no fixed breeding season. In general their breeding activities are most marked towards the end of the rainy season, that is during the months of December, January, February or March. The kinikini, sloké and parakeets are then busy breeding. In contrast the birds that like the presence of man and are found near the houses like the chuchubi, moffi, totolica, barica-geel etc. breed all through the year. During or right after the "short" rainy season in May, we everywhere find the nests of pigeons, for instance those of the ala blanca, the buladijfi and the ala duru.

Until recently hardly anything was known about bird migration on Curaçao.

As a result of the activities of the bird marking station established in 1954, which obtains its rings from the Fish and Wildlife Service in the United States, a fairly complete list of North American migrants has now been compiled showing the dates of arrival on and departure from the island. Also a number of species were found to be passing the winter on Curaçao. The available space unfortunately does not allow me to enter into the details of bird migration in this area.

Finally I should like to tell you something about the protection enjoyed by the birds on the island. Few species are legally protected. The fact that new names continue to be added to the list of protected birds proves that the authorities realize the importance of bird life on the island. The police, too, are doing their best to see that regulations are observed.

Unfortunately, Curaçao still lacks a Game Act. Efforts have been made in this direction and it is hoped that, shortly, Curaçao and of course the other islands of the Netherlands Antilles, will have an adequate Bird Protection and Game Act, so that a number of rare island species may be preserved for science and posterity. In 1907 Dr. Jac. P. Thijssen, a famous Dutch naturalist, placed the following slogan on the cover of his booklet on bird protection: "Two birds in the bush are better than one in the hand". Now, more than fifty years later, these words have gained great significance for the Transatlantic Part of the Kingdom, sometimes called "The Six Caribbean Pearls".

Bird Migration in the Netherlands Antilles

In Europe Autumn is heralded by a shortening of the days and by the fact that many birds start to leave for their winter residence, or have done so long ago already. But the Netherlands Antilles are having the hottest time of the year during these months. All the same you may, especially in September and October, see all over the tropical areas of the Netherlands Antilles the results of the migration of birds. This does not mean that on the Netherlands Antilles the migration of birds is a clearly distinguishable phenomenon. One cannot organise observation posts in order to register the passing of thousands of birds. One would look in vain for large flights of cranes and geese, for example, flying south with apparent fixity of purpose, at regular intervals and along fixed routes.

All this is unknown on the Netherlands Antilles. Although Aruba, Curaçao and Bonaire are situated at only 12 degrees north latitude, several hundreds of birds come to the islands every autumn in transit from the breeding grounds in North America to the places where they spend the winter. The same applies to St. Martin, Saba and St. Eustatius, but on these islands no ornithological observations have been made during the periods of migration so that, in the next part of this chapter, I shall have to confine myself to Aruba, Curaçao and Bonaire.

What, then, are the signs of the advent of the northern winter in the ever sunny and warm landscape of these islands? And how can one see something of the migration of birds, that periodical mass migration of millions of birds from the northern hemisphere to the warmer southern regions?

In the tropical regions where there seem to be hardly any seasonal differences, the migration of birds is announced by the sudden appearance of hundreds that were not there before.

First of all come the swallows, in particular the barn-swallows from North America, which in the field are not to be distinguished from the European barn-swallows. They do not breed in the West Indian area. They breed in the more northern regions of North America where the climate is temperate or even cold.



Curaçao: Wilson's snipe, a migrant from North America

Courtesy of Friar M. Arnoldo

On Curaçao the first barn-swallows appear about the middle of August or somewhat later. In September and October they may be observed on the islands in large numbers, sometimes in flights of many hundreds. In November their number suddenly decreases sharply and during the winter months one sees only a few individual birds spending the winter in a number of suitable places among the mangroves along the south-west coast of the islands. Most of the birds have flown on to South America, where many of them even cross the equator. They spend the winter in regions as far as the southernmost tips of Chile and Argentina. In spring they cover the same long distance in a south-north direction.

In addition to the barn-swallow one may see on the Netherlands Antilles the sand-martin and the cliff swallow, but neither of these birds breeds on the Netherlands Antilles.

Where do all these swallows come from in autumn and how do they find their way to Aruba, Curaçao and Bonaire? They certainly come from northern regions. But do they cross the sea or do they fly over land?

The birds of passage who are in the habit of leaving the North American continent in autumn, may follow three different routes. Each of these routes is characteristic of certain species of birds.

Many North American migrants winter in the warm and tropical regions of Central America. These migrants have no chance of finding their way to the Netherlands Antilles.

But if they fly on, along the Central American isthmuses of Tehuantepec and Panama, to tropical South America, they sometimes make the short leap to Aruba via Colombia and north-west Venezuela. Of course, this is a much too simple way of representing things. But in any case this is the safest way for North American birds of passage to reach the tropical regions of South America.

The only North American yellow-bellied sapsucker ever caught on Aruba in the early part of November, which is still the only example of an individual of the woodpecker species ever observed in the Netherlands Antilles, probably followed the migration route via Central America and Northern Colombia.

Many of the swallows that appear on the Leeward Islands must have come that way.

Other species of birds look for suitable winter haunts on the islands of the Greater and Lesser Antilles. Flying along the east coast of the United States or through the wide valley of the Mississippi, which runs north-south, they come to the coast of the Gulf of Mexico, which they cross when weather conditions are favourable, until they land on Cuba, Hispaniola, Puerto Rico or the chain of the Lesser Antilles to which St. Martin, Saba and St. Eustatius belong.

These birds must be able to cross stretches of sea 150 miles wide with all the dangers attaching to it. But, in general, they are in a position to complete their journey by leaping from one island to the other. They generally spend the winter on the West Indian islands and do not go further south.

To this category of North American migrants belongs the redstart, the so-called parula or prairie warblers and other species, which, it has been established, winter on St. Martin, Saba and St. Eustatius.

Finally, there is a group of birds that may be called migrants in the best sense. They fly south straight from the southeastern United States, cross the

entire Caribbean Sea and fly straight to the north coast of South America. The greatest crossing these birds have to make is a non-stop flight of over 500 miles, namely the shortest distance between the island of Hispaniola and the north coast of Venezuela.

Before these birds alight on the mainland of South America, they may first rest on Aruba, Bonaire or Curaçao or on one of the other groups of coral islands in front of the north coast of Venezuela, for instance Las Aves and Los Roques. For our winged travellers this is certainly not an unnecessary break in the long journey. For the blackpoll warblers and the yellow-billed cuckoos, which are among the best known of the trans-Caribbean migrants, can only complete the formidable crossing with the greatest difficulty and by drawing on their last resources. Most of them are so exhausted when they at last reach the islands that they can be caught with the hand and alight in all sorts of places, even the most unlikely ones, to rest and to recuperate from the fatigues of the journey.

For the little blackpoll, which under the best of conditions weighs barely .6 oz., it is quite a feat to fly south across the sea uninterruptedly for at least 20 hours on end with the choice of either perishing in the waves in case of extreme fatigue or of persevering by drawing upon its very last strength. All reserves are used up, to such an extent even that, on arrival on Curaçao, the weight of the bird has decreased to approx. .35 oz., so that about half the original weight has been used up during the journey.

A yellow-billed cuckoo found in a state of exhaustion on Curaçao in 1952 weighed even less than half its ordinary weight, the bird being literally reduced to skin and bone.

Though precise information is lacking we may be sure that hundreds of small birds perish annually in the inexorable waves of the sun-drenched blue Caribbean Sea. It has also been found that many of those that have completed the crossing are too exhausted on arrival to recuperate properly, or fall an easy prey, though a very thin one, to all sorts of predatory beasts and to man.

Yet the blackpoll warblers and yellow-billed cuckoos stay on the islands for only a short period of time, which shows how rapidly and completely the stronger birds recuperate again. While one week birds may abound on the islands and we can find them literally everywhere in the gardens, along the roads, in fruit orchards and in the dry, prickly and scorchingly hot cactus wastes, they are gone the next week without one remaining behind. They have continued their journey to their winter haunts in tropical South America, a last easy lap of a few hundred miles due south.

Of these birds the blackpoll warbler has covered the greatest distance: it breeds in northern North America, in the undergrowth of the northern pine

forests, even as far as the interior of Alaska. And, in striking contrast to their summer haunts, they pass the winter in the luxurious tropical rain forests of Venezuela, Brazil and Guiana.

As a result of their geographical position Aruba, Curaçao and Bonaire are much used stepping stones for passenger migrants making their way across the sea southern regions. More than 40 per cent of the species found on these islands are migrants from North America.

Among them the European ornithologist finds many species known to him from the Old World. Among the enormous flocks of sandpipers and plovers peopling the extensive mud flats of lagoons, inner bays and mangrove borders, he may observe sanderlings and grey plovers, which he also knows from the mud flats and shallows of the North Sea. They are breeding birds from the northernmost parts of the arctic tundras of North America, Europe and Asia, which wander about the temperate and tropical coasts of all continents in winter.

The turnstone, too, is one of the birds that undertake world-wide migrations. From its arctic breeding grounds, which on Greenland stretch beyond 80° N. lat., it wanders south in winter as far as Patagonia in the south of South America, the Cape of Good Hope in South Africa, even as far as New Guinea, Australia and New Zealand.

When, in January 1952, I saw sanderlings as well as turnstones on the dazzlingly white and hot sandy beach of the island of Klein Curaçao, I could not but regard these birds with the greatest admiration: they are wanderers along the world's most divergent coastlines.

Aruba, Bonaire and Curaçao are the ultimate winter haunts of a number of North American breeding birds. I have already referred to the fact that a number of the many hundreds of barn-swallows passing through the islands in autumn may remain there throughout the winter. The same applies to many smaller and larger waders, for example the North American blue herons and other species of heron, to at least six species of sandpipers and four species of plovers, to the greater and lesser yellowlegs, to the common snipe, the blue-winged teal and the American widgeons. For the latter birds, as also for the rare lesser scaup ducks and for one of the lesser North American trushes, Aruba, Bonaire and Curaçao constitute approximately the southern boundary of the winter haunts.

During the winter months all sorts of birds of prey breeding in North America are also found on the islands: the peregrine falcon and the merlin hunt all sorts of smaller and greater waders on open flat terrain and the big white-and-black ospreys may be seen fishing over the bays and deserted southern coasts where fish abound.

In addition to migrants from the north we also find birds from southern regions that winter on Curaçao, since bird migration is not confined to birds of the Northern Hemisphere. When in the southern part of South America, in Argentina and Chile, winter is approaching, many species leave these regions where conditions are now becoming unsuitable for them and they must not go south, but north, namely in the direction of the equator. These migrations, which are undertaken in what are the autumn months in the Southern Hemisphere – thus our spring – are generally on a smaller scale than those we meet with in the Northern Hemisphere.

There are, however, a number of species whose annual migrations can fully stand comparison as regards strenuousness and distances covered with the migrations of their northern cousins.

Among these birds are the fork-tailed flycatchers, grey-breasted martins and other species which migrate to far beyond the equator, to northern South America, Curaçao and in exceptional cases even far more north.

These birds appear on the islands towards the middle of the southern winter and do not return south until spring is approaching there. They therefore stay on the islands from round about July to mid-October.

In October we may therefore see on Aruba, Curaçao and Bonaire, in addition to the shore birds that breed on the islands, migrants from the north as well as from the south: barn-swallows from Canada alongside with grey-breasted martins from southern Brazil and Paraguay, grey kingbirds from Florida and Cuba alongside with fork-tailed flycatchers from Argentina.

Thus we see on the Netherlands Antilles, just like in human society, a restless coming and going of travellers from all points of the compass.

The Fauna of the Leeward Islands

About 600 miles northeast of Curaçao lie the islands of St. Martin, Saba and St. Eustatius, small green dots in the sunny blue of the Caribbean Sea. These small islands, known as the Leeward Islands and having a total area of less than 48 square miles (i.e. less than one seventh of the total area of Aruba, Curaçao and Bonaire together) belong to the northernmost islands of the Lesser Antilles. They may be supposed to be of volcanic origin, which means that they have come into existence as mountains on the sea bottom without any direct contact with the continent. Of course animal life on the islands has all the characteristics of the isolated creation of the islands. For example, apart from certain species of rats and mice, there are no land mammals on the islands. There are, it is true, bats but these may quite well have flown over from one island to the other.

Nevertheless, the distribution of the small number of mammals on the Lesser Antilles raises quite a few questions that have not yet been adequately answered, particularly if it is remembered that, in geological times there lived, at least on St. Martin and the neighbouring island of Anguilla, a kind of rodent *) as big as a small horse which – judging by the fossilized remains – was related to the species of rodents still living on the South American continent to-day. The question of how this large mammal had succeeded in reaching the territory of the Northern Lesser Antilles and of the shape, size and relative position of the various islands during the Tertiary or Pleistocene periods can only be answered by hypothesis. It is important to note in this respect that although St. Martin, Saba and St. Eustatius do not have at present any important native land mammals, we find on the southern Lesser Antilles, from St. Kitts to St. Vincent, Grenada, Barbados and Tobago several species of fairly large rodents which are clearly related to similar animals living on the South American continent. Their existence testifies to a connection between animal life of the Lesser Antilles and of the American continent, which has, however, not yet been explained.

The origin of the mongoose, however, the only predatory land animal of

*) *Amblyrhiza inundata* Cope.

the Leeward Islands, is quite clear. Within the area of the Netherlands Antilles the mongoose fortunately occurs only on St. Martin. It is one of the many species of the so-called civet cats, directly related to the animals which were already famous in ancient Egypt, the ichneumons. They are fierce little animals, popularly believed to be exceedingly cunning, with short legs and a fat tail: very keen killers of snakes. In their South Asiatic homeland they are held in high esteem because they successfully attack the largest poisonous cobras. But on the West Indian islands they seem to be unable to match themselves with the much-feared fer-de-lance snake which, however, is not found in the Netherlands Antilles.

Originally, the mongoose lived only in South and South-East Asia. Around 1870 a number of them were imported into the New World, first on the island of Jamaica. From there man took the animals to the other islands of the West Indies, for instance via the French island of Guadeloupe. At first great things were expected of this species, which was completely unknown in Caribbean animal life. And indeed, on every island where he was introduced, the mongoose developed into a powerful and quick-acting means of killing the rats which played havoc among the sugar cane, also on St. Martin. After a comparatively short time the mongoose, increasing rapidly in numbers, had more than decimated the noxious rats. But it then became necessary for the mongoose to choose other animals for its prey, first all kinds of snakes and lizards and then various native ground birds and other birds nesting on or near the ground, including their eggs and young.

Finally, the mongoose became on many islands, including St. Martin, a notorious killer of poultry. The damage caused by the mongoose on St. Martin every year must be tremendous. No reliable data are available but it may be safely assumed that the small number of birds and reptiles, in particular the poor stocks of ground doves and – quite harmless – snakes is largely due to the mongoose.

It is very desirable that the present island governments should succeed in preventing the mongoose from being imported into other islands of the Netherlands Antilles.

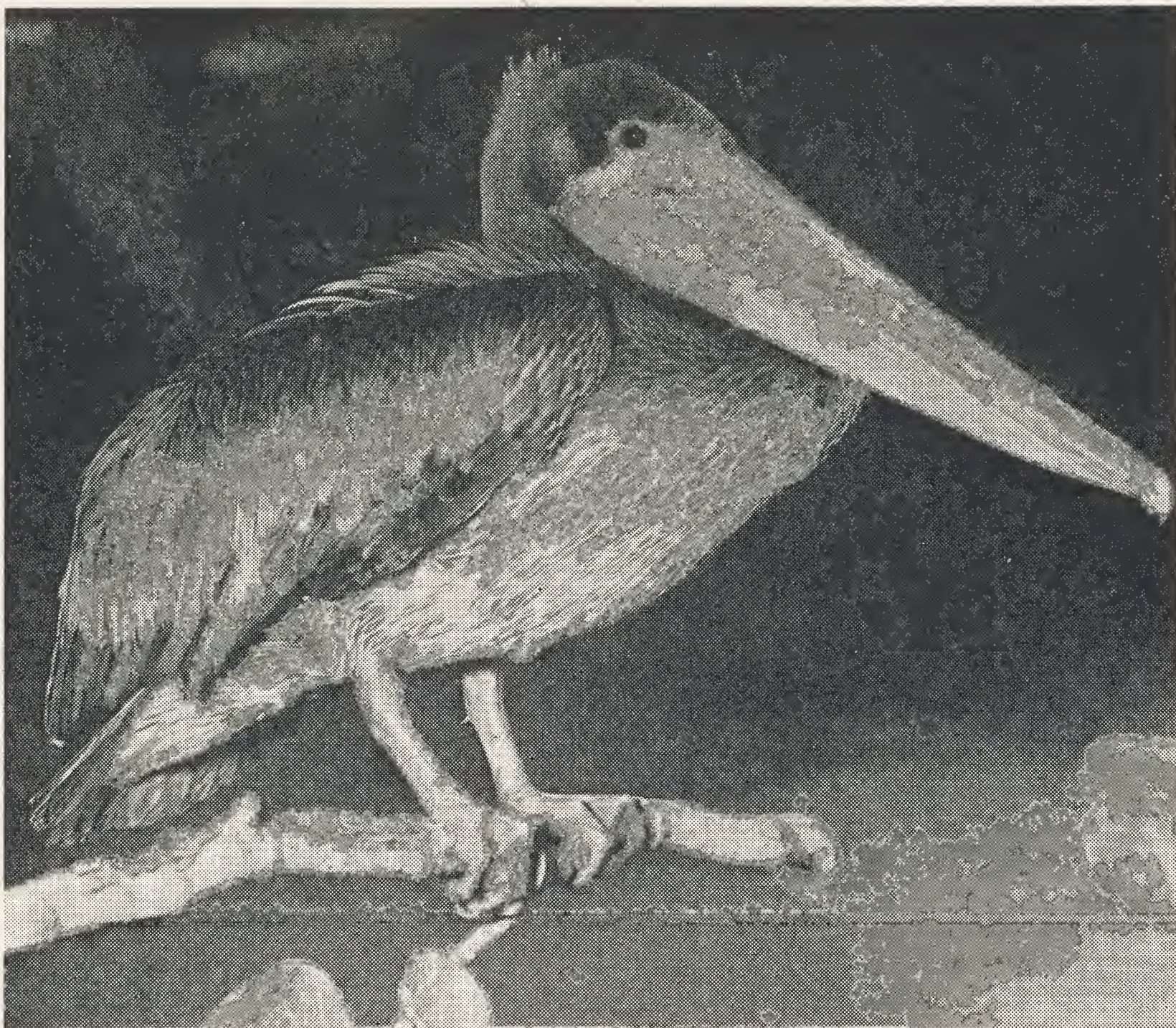
Native animal life on St. Martin, Saba and St. Eustatius is of course largely dependent upon existing natural scenery. Animal life on St. Martin is poor. Yet we find various kinds of ducks and waders, such as yellowlegs, curlews and plovers, especially in autumn in the region of the salt-pans. These birds come from northern regions. In the thorny brushwood and the poor seasonal vegetation on the hills we find totolicas or ground doves, yellow breasts (bananaquits) and the little black-faced grassquits that are called moffi on Curaçao and tobacco seed on St. Martin. All these birds are also found on

Aruba, Curaçao and Bonaire. But the two brilliantly coloured hummingbirds that are known as doctor-birds, the fast and shy mountain doves and a few other kinds are typical Caribbean elements that are lacking on the islands of Aruba, Curaçao and Bonaire.

In all, 53 species of birds are known on St. Martin. Eight of them, sea-birds, deserve special mention. For St. Martin has not only beautiful, glistening sand beaches with picturesque coconut palms, but also rough rocky coasts with steep cliffs and small crags rising from the sea known by such romantic names as Pelican Key, Hen-and-Chicken and Molly Beday. These islands and rocky coasts, which are rarely visited by local fishermen, are the breeding place of the pelicans, a few species of terns and perhaps of a number of West Indian boobies, tropic-birds and petrels. Personally I retain the happiest of recollections of St. Martin: the spectacle we were able to witness every morning from the breakfast table – the white beach lined with green palms, the blue sea shining in the sun and in the distance the stately silhouette of the island of Saba, in the air the robust forms of pelicans watching for shoals of fish swimming near the surface, hurriedly chasing and diving boobies and restlessly fluttering terns.

The island of Saba looks quite different from St. Martin although animal life is virtually the same on the two islands. Saba has no sand beaches, mangroves and salt-pans. But to make up for this the island rises steeply from the sea (its silhouette has been compared to Napoleon's general's hat), has around the top of its highest mountain, 2,790 feet above the level of the sea, a vegetation which is unique in the Netherlands Antilles. The slopes of "The Mountain" have been deeply cut into by steep gorges or gulleys on whose bottom a wealth of vegetation has flourished. Round the top of The Mountain there is usually a small cloud which gives the forest growing there a high degree of moisture. In this humid forest in which tree-ferns, great arums, lianes, orchids, bromeliads and nidulous ferns are the most remarkable features. There are several species of birds which are not found anywhere outside the special biotope of mountain forests. As a rule they are rare species, such as the so-called trembler, the green euphonia, which eats berries, and the mysterious quail-dove, which we also find on St. Eustatius.

High against the rock of Saba, which rises to over 2,000 feet, where the cliffs go down in almost a sheer drop into the sea, which is ruffled by the stiff northeasterly trade wind, the West Indian shearwaters have their nests. During the day these birds roam the seas around the islands. In the breeding season they come ashore, dig holes and burrows in the soft humus among the rocks near the summit of The Mountain, making a deafening noise. Underground, near the end of the nest gallery, they lay a single calcareous white



Curaçao: Brown pelican in fledgling plumage. Pelicans usually roost in trees.

Courtesy of Friar M. Arnoldo

egg, which is hatched in almost complete darkness. During the night the male and the female take turns at caring for the egg. In doing so they make all kinds of queer and alarming noises. These noises from the mountain slope form the queer nocturnal song of these birds, which are decidedly sea birds and which only come ashore to breed.

St. Eustatius, the third of the Leeward Islands, is again quite different as compared with St. Martin and Saba. The low grass-covered hills of the central part of the island where agriculture of sorts is laboriously carried on, rather resemble the pastures of St. Martin. The bird population is also virtually the same, with small American kestrels or killy-killies and the noisy kingbird, a large grey bird which behaves rather conspicuously and which is also found on Aruba, Bonaire and Curaçao.

St. Eustatius, with its great extinct volcano, The Quill, has a character all its own. The beautiful regular cone of this 2,000 feet high mountain dominates the island.

Inside the old crater there is a deep pit with almost sheer walls 300 to 500 feet high. Deep in this pit, hidden from view, there is a miniature forest, which has almost the character of a tropical rain forest: dark and humid, tall trees with plank-like or buttressed stems, lianas hanging down like long cords and a soft humus soil. It is little short of sensational to enter the forest by descending the steep abyss by using a single natural "stair" of rocks and tree stumps, using drooping branches and lianas as a hand rail. One descends, as it were, into the forest through the treetops down to the dark bottom of the wood, which teems with dark brown lizards with big heads, less than four inches long. In places where the sun manages to penetrate to the ground one sees beautiful yellow and black or orange butterflies, the real tropical species with slim bodies and long tapering wings.

On the outside slope of the crater we find green iguanas and, in the most humid parts of the forest, large land crabs and the smaller hermit crabs living in snail shells. The silence of the forest is broken by the melodious and plaintive call of the slim and nimble wood pigeon or mountain dove and, high up, near the brink of the crater, big blue rock doves sound their heavy call which is not unlike the call of the European wood pigeon. And in the darkest parts of the forest of the Quill, where rocks and tree stumps are covered with thick layers of springy moss, lives the quail-dove. Protected by the dense undergrowth it walks about in a very upright position on long legs, or flies zigzag among the trees, silently like an owl or woodcock: a large-eyed phantom bird which, at first sight, bears only little resemblance to a dove.

So St. Martin, Saba and St. Eustatius, emeralds in the crown of the Netherlands Antilles, each possess their own little gems of natural beauty with a fascinating flora and fauna, in every respect worth being preserved and studied.

Protection of Game and Natural Beauty on the Netherlands Antilles

In Europe it is the custom to organize, on the third day of November – the day of St. Hubert – a shooting party during which the noblest of all game is shot in an almost ritual manner. With this in mind, one pictures hazy autumn days with an abundance of game, preparing for the hardships of approaching winter by eating the rich crops. So St. Hubert's day is in the middle of the hunting and shooting season. This day, dedicated to the patron of hunting and shooting affords perhaps a suitable occasion for saying something about shooting in the Netherlands Antilles.

During these autumn days in Europe, it is very hot in the Netherlands Antilles. These not, generally fairly wet months, are followed by months when temperatures may fall a little but which are definitely much dryer. After that temperatures go up again and there is hardly any rain. So there is but little variation in the seasons.

In any case things are quite different when compared with the temperate climate of Western Europe. Neither do the Netherlands Antilles have an open and a close shooting season: shooting goes on throughout the year. There is no big game on the islands, but people shoot various species of pigeons, so-called or "partridges" or "patruchis", i.e. the West Indian crested quail, and "rabbits" or South American desert hares, and ducks.

Shooting these smaller species appeals highly to sportsmen. One must be a good shot to be able to hit the "ala blancas", white-winged or bare-eyed pigeons which fly fast and high. Shooting the swift and evasive eared doves or bula doves is even more difficult without preparation. Shooting partridges and rabbits, which is mostly done by using the 'snap' or 'hold on' system, requires not only a quick and sure aim, but also a profound knowledge of the terrain, as well as perseverance and complete concentration to find one's way among the bushes and cacti in the scorching sun, and to be ready at any moment to draw a bead on a partridge which shows itself for one moment but is gone again a moment after, without being tempted to risk a random shot.

Nevertheless, the fact that there is no close shooting season results in a rather unsatisfactory situation, both for the birds and other animals, which

Sloké or crested quail, a favourite game bird on Aruba and Curaçao.

Courtesy of
Friar M. Arnoldo



are not left alone during a certain period, and for sportsmen themselves, who tend to take the pleasures of shooting too much for granted.

Quite apart from the question of whether or not one feels attracted by shooting and hunting, the introduction of a close season entails many problems of a more general nature.

In European countries, where hunting and shooting are governed by adequate legal provisions, shooting is only allowed in autumn and the beginning of the winter. That is to say, the animals are not interfered with during the breeding season, or the difficult weeks at the end of the winter.

On the Netherlands Antilles we do not find similar seasonal changes. We therefore have to ask ourselves whether, and to what extent, other factors exercise a seasonal influence on the flora and fauna of the islands. We must investigate whether birds on the Netherlands Antilles have so-called breeding seasons and, if so, when they are and what are the determining factors.

We must also see whether periods of light rainfall, or even drought, give the annual cycle a certain seasonal rhythm. Finally, it must be ascertained

whether all birds breed on the Netherlands Antilles or whether some of them only spend the *northern winter* on the islands so that they can only be shot during a certain period of the year.

On Aruba, Bonaire and Curaçao there is no clearly defined breeding season. On these islands the Netherlands saying that, in May, every bird lays an egg, is not true. Now it has been found – not only on the Netherlands Antilles but in all tropical regions – that there is a certain relationship between the periods of adequate rainfall and the breeding seasons, so that one witnesses on the Netherlands Antilles something which is rather strange to Western European ideas, namely that most birds on the islands start breeding round Christmas and the New Year. But if a certain year should have more rainy periods one will see that all the islands breeding activities increase.

In fact, pigeons, quails, ducks and other smaller birds have been found breeding in all months of the year. Little downy quail chickens may be found in December, in July and in all intermediate months; each year the situation is different. It is clear that the breeding time gives hardly any clue to those wishing to lay down legal regulations governing the shooting of these birds.

We should now say something about the periodicity of rainy and dry periods. The annual rainfall on Curaçao, for instance, was 22 inches between 1894 and 1933. But this figure does not say much for the actual rainfall which varied between just over five inches in 1930 and well over 42 inches in 1906. There have been very dry periods lasting for more than five years at a stretch, but also extremely dry periods which lasted for only four months and which were then followed by excessive rain.

Once we realize how close the relation is between breeding in animal life on the islands and the amount of rain falling in a given period, we can understand that there is no seasonal cycle in animal life on the Netherlands Antilles.

Running or stagnant water is scarce on the Netherlands Antilles. Therefore the few fresh water springs and fresh water ponds, known as “tankis”, acquire an ever greater importance to animal life in periods of continued drought – nay, they even become a condition of life. All kinds of animals come there, from all over the sun-scorched islands, to quench their thirst.

Unfortunately, until quite recently large flights of pigeons as well as the Curaçao deer – which may no longer be shot – were killed in large numbers near these oases by sportsmen from ambush. These methods, which had nothing to do with sportmanship, have been stopped although they have not been forbidden by law.

As we have seen the capriciousness of the Antillean climate makes it impossible to lay down sensible rules governing the shooting of birds, etc. But when prolonged periods of drought have decimated animal life the real sports-



Curaçao: Totolica or ground dove.

Courtesy of Friar M. Arnoldo

man will not reach for his gun but will, on the contrary, do everything in his power to relieve distress among the animals.

Finally, we must say something about the birds eligible for shooting but which do not breed on the Antilles. There are indeed quite a few species of North American duck which come to the Netherlands Antilles in the autumn to spend the rainy winter on the islands when there is ample fresh and brackish water. Among these birds are blue-winged teal and American widgeons. There would be no objection at all to shooting these birds (provided it is done in a proper manner) but for the fact that, as a rule, another species of duck, the Bahama pintail, breeds during their short stay on the islands so that the sportsman runs the risk of shooting not only-breeding birds, but also ducks that have a nest somewhere or even fledgelings.

The laying down of legal regulations governing shooting on the Nether-

lands Antilles therefore meets with numerous theoretical difficulties. Nevertheless, the Netherlands Antillean authorities have for a long time been trying to arrive at a workable legal system to regulate shooting and protect natural beauty. Dr. J. H. Westermann in particular has repeatedly emphasized the ethical, aesthetic, scientific and economic aspects of the protection of natural beauty on the Netherlands Antilles. It is a matter of maintaining an adequate number of preserves on each of the islands, on the one hand for ensuring an economically justified system of water control, and on the other for protecting a number of Antillean animals.

There are now two important ordinances for the protection of the fauna of the islands in the Antillean part of the Kingdom: the "Decree for the Protection of Animals Useful to Agriculture and Fruit Cultivation" of 1926, and similar supplementary decrees of 1931 and 1934 as regards "species of animals that are slowly becoming extinct and which it is considered important to preserve".

However useful these decrees may be, their very names indicate their unsatisfactory character, implying as they do that their should be animals on the Antilles "which it is *not* considered important to preserve". Fortunately it may confidently be expected that, as the realization of autonomy among the Antillean people grows, they will also begin to realize their responsibility towards the natural beauty of their islands. For if the population itself does not recognize the urgency of the protection and preservation of nature, no rules and regulations, however well meant and however expertly drafted, will be able to prevent nothing being left within a short time of the natural wealth, and natural attractiveness, of the islands. In this respect a far-sighted cultural and economic Government policy, the interests of sportsmen and the ideals of the protection of natural beauty go hand in hand. It was a very desirable measure which in 1931 prohibited the shooting of Curaçao deer. As a result of the continued deforestation of Curaçao and the increased density of the population this animal, which already lives under difficult conditions, would probably not have been able to survive and this would have meant the disappearance of an animal which man would never have been able to bring back. It is also a matter for satisfaction that the flamingo colony on Bonaire not only enjoys legal protection but is also beginning to earn the appreciation of the island population, which is gradually coming to realize the beauty of these wonderful vivid orange-red exotic birds.

We do hope that, for a long time to come, the authorities and the people of Bonaire will see to it that these rare birds, which man has more than decimated in the Caribbean area, will be protected as a precious gem. For it is remarkable that, in these days, there should still be parts of the world which

are unspoiled and have large, striking animals; it may be considered a privilege to have flamingos on Bonaire at all to be protected.

It is also a privilege that, on Aruba, there are still small burrowing-owls and perhaps even a few green parrots, but both species should be protected immediately. For the parrot it is perhaps already too late but the other animals living on Aruba may yet be saved!

We are therefore looking forward to the enactment of legal provisions regulating shooting and the protection of natural beauty, and also covering the important coastal and marine fauna. These legal provisions should also provide for the establishment and maintenance of preserves on each of the islands.

The Denizens of the Antillean Seas

To European ideas animal life in the Antillean seas is even stranger and even more varied than animal life on land. In the warm waters around the islands we find communities of great variety: animals living in the shallow mud of the coastal area and mangrove forests, animals of the wide glistening sand beaches and of the rocky coasts rising steeply from the sea, animals living in the many-coloured coral gardens and among the tremendous coral reefs, of the deep dark sea bottom and of the clear waters above it, and animals of the open sea.

The sea has not only given the Netherlands Antilles their present prosperity by shipping and trade, its wealth of colours attracts many tourists. The inhabitants of the islands are beginning to take an ever growing interest in the sea and the animals living in it. Through the pleasures of beach life in the tropics we have come to perfect the art of skindiving and observing and hunting fish in the coastal waters. It is no doubt a delight for experienced swimmers to watch subaquatic animal life simply by swimming on the surface of the water and looking down through goggles. When we dive – sometimes provided with an apparatus to breathe air or oxygen from special cylinders – our delight grows as we descend to the corals and rocks of the sea bed and chase many fish in their own element. By using thin sharp spears and small ‘rifles’ provided with harpoons, all kinds of fish are ‘shot’ and drawn from the crannies, where they hide when in danger, by long lines. Here, too, there is a danger that people will kill and destroy many beautifully coloured fish just for the fun of killing. But there is a much more sportmans-like pastime: hunting with an underwater camera.

In the tropical warm waters round the islands where the water is clear and has much oxygen and food as a result of incessant motion, coral reefs have developed since the formation of the islands in geological times.

Corals are small polyp-like organisms which, living in colonies, together build gigantic lime constructions. As a result of the fact that every organism, which has a stalk and which is radiated or star-like, produces a hard lime skeleton, massive coral structures are erected that vary in colour, composition and form according to species.

Although the West Indian corals cannot boast the same extensive variety as Indo-Australian waters, we do find in the waters round the Netherlands Antilles a great many different kinds of coral. The greater part of the corals belong to what are known as the staghorn corals with their delicate antlerlike ramifications, more delicate and exquisite as the water in which they grow is quieter. They form brown, brown-green, green and purple woods of fantastic branches and twigs, generally in places where the sea bottom is flat. True, they look delicate and exquisite, but they are of rugged construction, for the lime skeleton is sharp and the extensive fields covered with these corals which extend from just under the surface of the water until some dozen yards deep form as a result of their bulk serious obstacles to coastal shipping all over the world. When swimming in the neighbourhood of the corals one should be careful not to be scratched or cut by the coral branches.

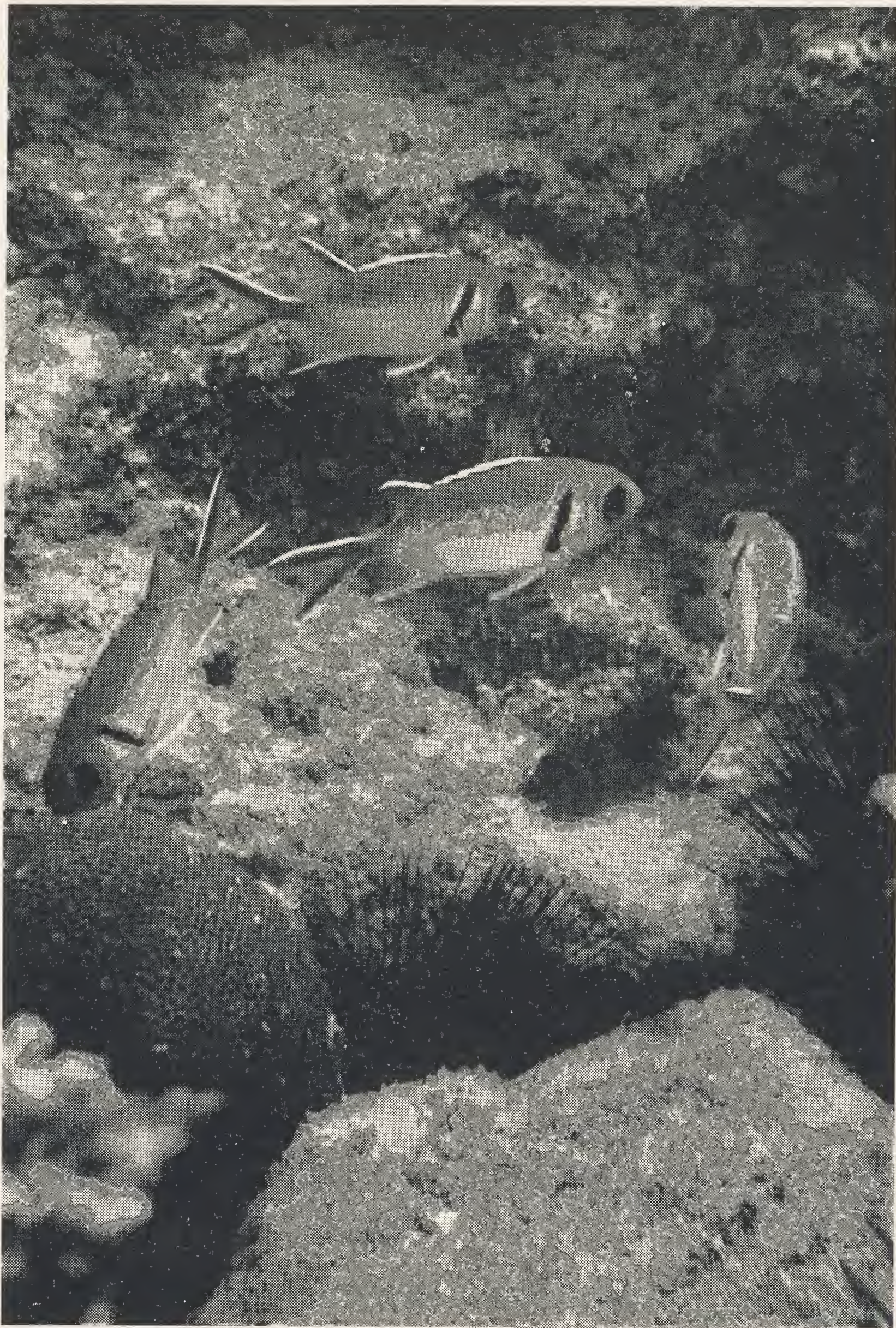
Then there are corals with flat broad slabs which are most appropriately called elkhorn corals, there are also organ-pipe corals, brain-corals and a great number of other varieties.

All these corals grow and extend in a varicoloured tangle: the younger coral polyps at the outermost ends of the colony, the older polyps finally dying and adding their solid lime skeleton to the massive structure of the basis of the coral reef, century after century until at last there are masses of coral lime, some of them hundreds of yards thick. On top of it the living coral polyps grow on the outer edges.

When you touch the living corals you feel something slimy. With the so-called nettle-cells and nettle-batteries of the living polyps the living corals may sting and burn when touched. The liquid from the nettle-cells of the so-called millepore or burning coral possesses exceptionally burning qualities. When dozens of these coral polyps in defence discharge their nettle liquid into the human skin, it may be so seriously irritated that painful blisters are caused which are sometimes accompanied by fever.

In places where the corals build so-called reefs at a distance of some dozens of yards outside the coast, they may soon be situated in the surf. Then the uppermost and outside ridge is continually being broken off by the relentless onslaught of the waves – the sea takes back what it had first allowed to grow in quiet waters. At great depths, where the water is perpetually at rest, there are no corals: they need sunlight for their nutrition, for all reef corals are dependent for part of their food on unicellular algae which possess a certain pigment and which live as symbionts in the thin jellylike skins of the coral polyps.

In places where the sunlight is unable to penetrate and where the breakers of the surf destroy the delicate coral branches, the coral breaks off. The polyps



Kandelchi cora or red squirrel fish, one of the multi-coloured fish living among the coral reefs. In the foreground the long purple spines of sea-apples hidden in crannies.

Courtesy of Fischer

are consumed by the sea water and the lime skeletons are washed on to the so-called coral reef in the form of fantastically shaped pieces of limestone that have been polished and rounded by being continually rolled in the sea. At low tide they lie bleaching in the sun and they become porous stones, first grey, later dazzlingly white. In these stones one can easily recognize the structure of the regularly formed and intricate pores.

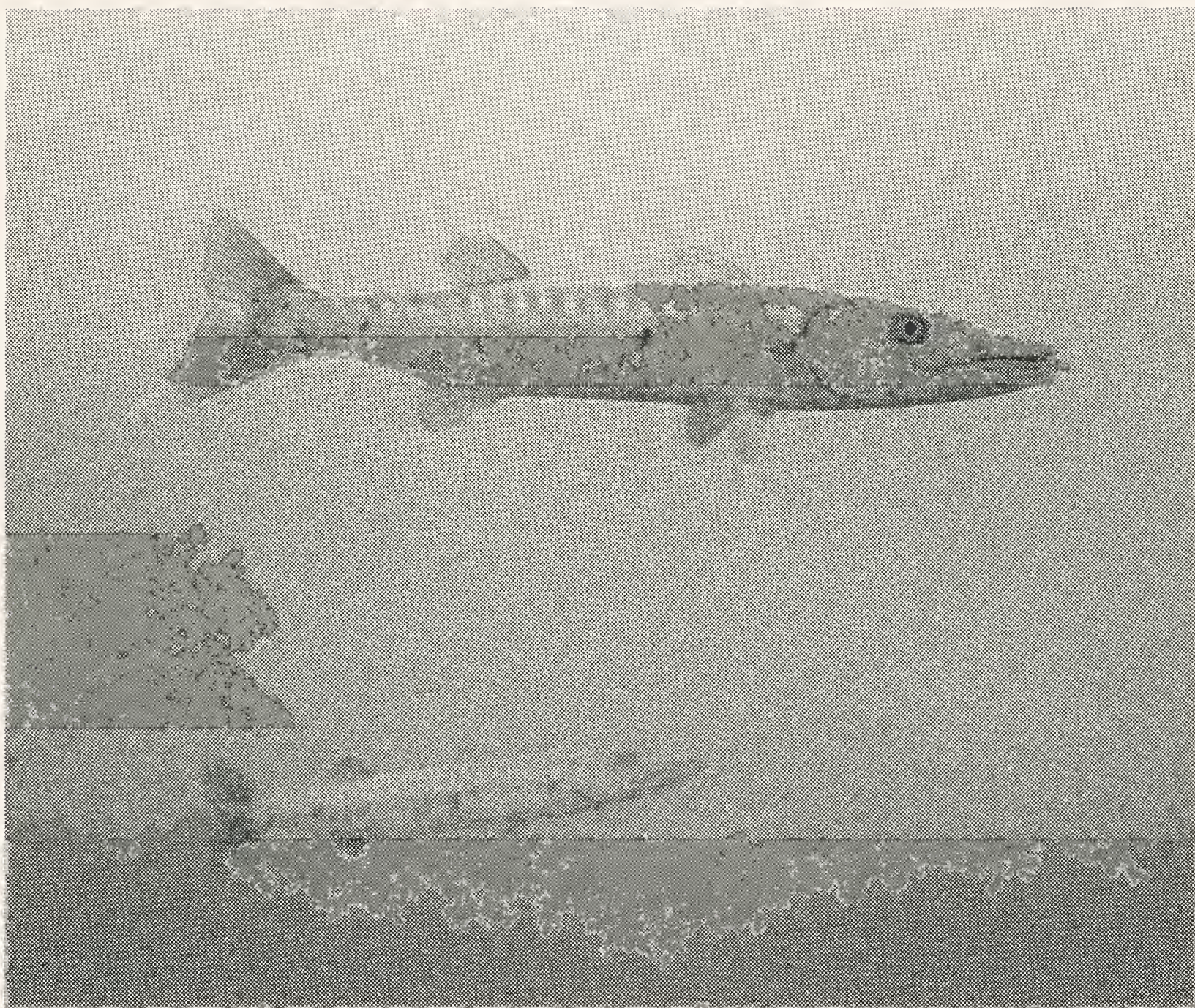
There are also coral organisms whose skeleton does not consist of lime but of a horny substance. These are the so-called horny corals, the big fans and plume-like feathers that resemble submarine plants. Of course these so-called sea-fans and sea-whips are colonies of many thousands of polyps. They are attached to the rocky seabed or to a stone or big shell by means of a small pedestal. Large fields of these colonies form submarine forests which gracefully bend and wave with the motion of the water. Like the other coral polyps, these polyps feed on vegetable and, in particular, animal plankton and all kinds of other minute organic matter floating in the water.

A coral reef is an intricate community which consists of more than corals. In addition, the various kinds of corals make different demands as regards location, the amount of light they need and probably also the motion of the water and the supply of food, so that the arrangement of a coral reef is not something arbitrary without rules. There is order here, but, at least in the area of the Netherlands Antilles, very little is known of its principles. It will probably be one of the first subjects to be studied by the Caribbean Marine Biological Institute at Curaçao, now under construction.

Coral reefs offer a home to a great variety of animals; worms, snails and molluscs, starfish and sea-urchins, lobsters, crabs, squids and fish, just to mention a few of the larger groups. Everything in a coral reef bites, pricks and stings; not least the burning corals we have already mentioned and especially the dark purple sea-urchins and sea-apples. The latter have prickles sharp as needles which project to all sides just like those of a hedgehog. They live in crevices, hidden and made invisible by branches of corals. The sharp prickles can penetrate deeply into the human skin and are then apt to break so that they cannot or only with great difficulty be removed. They also introduce a small amount of poison into the blood so that persons who are allergic to it, after having been stung by the purple sea-urchin, are apt to develop ulcerations and, sometimes, a fever. Finally the prickles, which consist of lime, are dissolved by the blood.

Among the coral reefs live a great many different kinds of fish which all feed, directly or indirectly, on the coral.

There are the small vividly coloured butterfly fishes with their tiny, long snout – sharp as tweezers. They nibble at the coral polyps and catch minute



The barracuda, a much-feared pike-like predatory fish found in all tropical coastal seas.

Courtesy of Fischer

organisms in cracks and crevices. They usually have multicoloured stripes and spots which make them very difficult to distinguish in the fanciful play of light and colour among the corals.

Some species have great dark eye-like spots, which are generally found at the back of the body, however, it may be assumed that they serve to frighten enemies.

There are trunkfish and swellfish, various kinds of bass, blue and green parrotfish, pipefish and sea-horses, gurnards and morays. The latter are savage, voracious fishes which hide in narrow crevices and suddenly dart forward. They are generally known as sea-snakes or *colebra di awa* and native fishermen are very much afraid of them because their bite is considered poisonous. Sea-snakes, real snakes living in the sea, have so far not been found in the Caribbean waters.

Special mention should be made of the parrot-fish or gutus. With their sharp, more or less beak-like jaws, they nibble and gnaw continuously at the hardest coral formations to feed on the polyps. Some investigators consider the parrotfish as the most important cause of the fine white coral sand which the waves, in quiet and shallow places along the south coast of the islands, have washed ashore to form beautiful sandy beaches.

Of the larger varieties the barracuda, a voracious pikelike marine fish, deserves our special attention. They sometimes attain a length of well over three feet. They are found in all tropical coastal waters in the world. They are also well-known on the Netherlands Antilles, where their audacity sometimes frightens people bathing in the sea. There are all kinds of stories about their voracity. Although it seems that, in other parts of the world, there have been cases of people bathing being seriously attacked, the fear of these animals on the Netherlands Antilles is not warranted by any known case of a barracuda attacking a human being.

Another kind of large predatory fish is the dradu, which looks something like the dolphin. Because of their shape they are often taken for real dolphins, i.e. toothed whales. Unlike the barracuda the dradu lives in open sea where the depth of the water gives the surface a dark blue colour. In the shallower, but often narrow coastal waters, the colour of the water is lighter with more green in it.

The dradu is fond of chasing shoals of flying-fish. They both live in the higher strata of all tropical seas and therefore have, just like the barracuda, a so-called circumtropical distribution.

The common flying-fish or fleerchi can best be described as a herring with stiff drawn-out pectoral fins, the lower lobe of the caudal fin having been lengthened. But they are not closely related to the herring. They can glide for dozens of yards on their spread-out pectoral fins a few feet above the waves, sometimes even higher. They use this capacity for flying, or rather gliding more particular when chased by other fishes.

When one sees in the Caribbean large numbers of flying-fish shooting out of the waves and appearing again immediately after they have fallen back into the water, one may safely assume that they are being chased by a shoal of fast swimming dradus. But out of the water the flying-fish is not safe either. Once they have escaped the voracious beaks of the dradus, they are in the air attacked by the frigate-bird.

These large marine bird which are known on the Netherlands Antilles as skerchi or macuacu, sometimes attain a wingspan of six feet or more. Like greedy hounds they dive down to seize the flying-fish gliding through the air with their hooked beaks, before their prey falls back into the water. When

doing this these great flyers do not touch the water, not even with the tips of their wings.

When in open sea we are lucky enough to discover the dorsal fin of a speeding shark, or a turtle which is quietly sunbathing at the surface, we know for certain that we are in the famous "blue Caribbean".





